INDEX TO VOL. XXIII.

ABSORPTION of fat in dogs, 65.
Acapnia and shock, 345.
Acidosis, xxxvii.
Adrenalin, influence over internal hemorrhages, xxv.
——, its prolonged existence in the blood, 226.
——, resuscitates the heart, xxi.
Albuminuria, relation to pulse pressure, xi.
Alternating current in the physiological laboratory, xxxvii.
——, used in place of a tuning-fork, xxxv.
Altitude, effect on blood pressure, 90.
Apparatus for recording outflow, 23.
Asphyxia, production of hyperglycæmia, 278.
AUER, J. See MELTZER and AUER, 141.
AUER, J. The course of the contraction wave in the stomach of the rabbit, 165.
AUER, J. The effect of carbon dioxide upon the pupils of frogs, xvi.
AUER, J., and S. J. MELTZER. The effect of calcium infusions upon the irritability of the heart vagus, xx.
AUER, J. The inhibitory effect of laparotomy upon some of the functions of the splanchnic nerves, xvii.

BARRINGER, T. B. See HENDERSON, BARRINGER, and HARVEY, xxx.
BENEDICT, F. G. See CARPENTER and BENEDICT, 412.
BENEDICT, S. R. See MENDEL and BENEDICT, xviii.
BERG, W. N. A comparative study of the digestibility of different proteins in pepsin-acid solutions, 420.
Blood, analysis of gases in, xxxvii.
——, diastases, 148.
Blood pressure, in high altitudes, 90.
BRAUTLECHT, C. A. See OSBORNE, LEAVENWORTH, and BRAUTLECHT, 180.
BRODIE, T. G. Demonstration of a new method of determining the rate of blood flow through an organ, xxxvii.
BRODIE, T. G. Some recent variations in the analysis of the gases in small volumes of blood by the chemical method, xxxvii.
BURTON-OPITZ, R. On the vasomotor nerves of the spleen, xxxvii.
BURTON-OPITZ, R., and D. R. LUCAS. The influence of the left splanchnicus major upon the vascularity of the normal right and the denerved left kidney, xxxvii.
BUSCH, F. C., and T. H. MCKEE. Resuscitation by the direct injection of adrenalin into the heart cavities, xxi.

CALCIUM excretion, xviii.
CANNON, W. B. Further observations on the myenteric reflex, xxvi.
CANNON, W. B. The acid closure of the cardia, 105.
CARLSON, A. J., and J. B. LUCKHARDT. On the diastases in the blood and the body fluids, 148.
CARLSON, A. J., and A. WOELFEL. On the internal secretions of the thyroid, xix.
CARLSON, A. J., A. WOELFEL, and W. H. POWELL. A possible hormone vasomotor mechanism, xxiii.
CARPENTER, T. M., and F. G. BENEDICT. Metabolism in man with greatly diminished lung area, 412.
Centrifugal force, effect on eggs of the sea urchin, 460.
Cerebral localization, xiv.
——, in man, xxvi.

Circulation, method for determining the rate of flow through an organ, xxxvii.
Coronary vessels, innervation, xxiv.
CRILE, G. W. Further observations upon surgical shock, xxxvii.
CUSHING, H. A note upon the faradization of the postcentral convolution of the human brain in conscious patients, xxvi.
CUSHING, H. See REFORD and CUSHING, xxvii.

DANIEL, J. F. The adjustment of paramecium to distilled water and its bearing on the problem of the necessary inorganic salt content, 48.
Diastases in the blood and the body fluids, 148.
Digestibility of proteins, 420.
Distilled water, effect on Paramecium, 48.
DUKE, W. W. See HOWELL and DUKE, 174.

EDMUNDS, C. W., and G. B. ROTH. Action of barium chloride on the fowl's muscle, 46.
EDMUNDS, C. W., and G. B. ROTH. Concerning the action of curara and physostigmine upon nerve endings or muscles, 28.
Egg, affected by centrifugal force, 460.
ERLANGER, J. A method of studying the physiology of mammalian heart tissue, xxxiii, xxxvii.
EVERINGHAM, S. See LEE and EVERINGHAM, xxxvii.
Eye, effect of carbon dioxide in the pupil, xvi.
EYSTER, J. A. E. See HOOKER and EYSTER, xxxvii.

FAT, absorption from an isolated loop of intestine in healthy dogs, 65.
Fever, protein metabolism in, xxxvii.
FRANZ, S. I. Sensibility of the hairs following nerve division, xxii.
FRANZ, S. I. Temperature sensations following nerve division, xxii.
FULLER, J. G. See HART, MCCOLLUM, and FULLER, 246.

GALVANOMETER, xxxvii.
Gestation, protein metabolism in, xxxi.
Glycocol, asparagin, and glycylglycinanhydride, effect on elimination of nitrogen, urea, and ammonia, 324.
Glycosuria from asphyxia, 278.

HABIT formation related to intensity of stimulus, xiii.
Hairs, sensibility of, following nerve division, xxii.
HALE, W. The action of the alkaloids of the Papaveraceæ upon the isolated frog's heart, 389.
HALE, W. The action of the alkaloids of the Papaveraceæ upon the motor nerve endings, 408.
HART, E. B., E. V. MCCOLLUM, and J. G. FULLER. The rôle of inorganic phosphorus in the nutrition of animals, 246.
HARVEY, S. C. See HENDERSON, BARRINGER, and HARVEY, xxx.
HATCHER, R. A. The absorption, excretion, and destruction of strophanthin, 303, xxxvii.
Heart, action of alkaloids of Papaveraceæ upon, 389.
——, diagram of work, xxxvii.
——, effect of calcium infusions on the irritability of the vagus, xx.
——, in acapnia and shock, 345.
——, innervation of coronary vessels, xxiv.
——, metabolism on stimulation of the accelerator nerve, 174.
——, method of studying, xxvii.
——, output of, 345.
——, resuscitation by adrenalin, xxi.
——, rigor affected by stimulation of the vagi, xxviii.
——, studied by observing strips of the auricle, xxxiv.
HEDBLOM, C. A. See SCHNEIDER and HEDBLOM, 90.
HEGEMAN, R. F. See HOOKER, HEGEMAN, and ZARTMAN, xi.
Hemorrhage, internal, influenced by adrenalin, xxv.
HENDERSON, Y. Acapnia and shock. — II. A principle underlying the normal variations in the volume of the blood stream, and the deviation from this principle in shock, 345.
HENDERSON, Y. A diagram of the normal behavior of the heart at all rates of beat, xxxvii.
HENDERSON, Y., T. B. BARRINGER, and S. C. HARVEY. The regulation of venous pressure and its relation to shock, xxx.
HEYL, F. W. See OSBORNE and HEYL, 81.
HOOKER, D. R., and J. A. E. EYSTER. An instrument for the determination of the venous pressure in man, xxxvii.

HOOKER, D. R., R. F. HEGEMAN, and L. V. ZARTMAN. The relation of pulse pressure to the appearance of albumin in a case of orthostatic albuminuria, xi.
Hormones possibly affect the vasomotor mechanism, xxiii.
HOWELL, W. H., and W. W. DUKE. Note upon the effect of stimulation of the accelerator nerve upon the calcium, potassium, and nitrogen metabolism of the isolated heart, 174.
HYDE, I. H. The effect of salt solutions on the respiration, heart beat, and blood pressure in the skate, 201.
Hydrolysis of fish muscle, 81.

INTERNAL secretion of thyroid, xix.

JACKSON, D. E. The prolonged existence of adrenaline in the blood, 226.
JOSEPH, D. R. The inhibitory effect of magnesium upon some of the toxic effects of eserin, 215.
JOSEPH, D. R., and S. J. MELTZER. The effect of subminimal electrical stimulation of the vagi upon the development of cardiac rigor, xxviii.

KIDNEY vascularity influenced by the splanchnic nerve, xxxvii.
KING, J. L., and S. SIMPSON. Motor localization in the cerebral cortex of the sheep, xiv.
KING, J. See VOEGTLIN and KING, xxxvii.
KOBER, P. A. See LEVENE and KOBER, 324.
Kreatin excretion, 1.
Kreatinin and kreatin excretion, 1.

LEAVENWORTH, C. S. See OSBORNE, LEAVENWORTH, and BRAUTLECHT, 180.
LEE, F. S., and S. EVERINGHAM. Fatigue of muscle stimulated directly and indirectly, xxxvii.
LEVENE, P. A., and P. A. KOBER. The elimination of total nitrogen, urea and ammonia following the administration of glycocol, asparagin, and glycylglycinanhydride, 324.
LUCAS, D. R. See BURTON-OPITZ and LUCAS, xxxvii.
LUCKHARDT, J. B. See CARLSON and LUCKHARDT, 148.
Lung, relation of loss of substance to metabolism, 412.
LYON, E. P. Rheotropism in fishes after blinding one eye, xxxvii.
LYON, E. P., and E. M. WILLIAMS. Uses of the alternating current in the physiological laboratory, xxxv, xxxvii.

MACLEOD, J. J. R. Studies in experimental glycosuria. — IV. The cause of the hyperglycæmia produced by asphyxia, 278.
Magnesium and calcium excretion, xviii.
Magnesium inhibits eserin, 215.
Magnesium salts, action of, 141.
MCCLENDON, J. F. Chemical studies of the effects of centrifugal force on the eggs of the sea urchin (Arbacia punctulata), 460.
MCCOLLUM, E. V. See HART, MCCOLLUM, and FULLER, 246.
MCKEE, T. H. See BUSCH and MCKEE, xxi.
MEIGS, E. B. Heat coagulation in smooth muscle; a comparison of the effects of heat on smooth and striated muscle, xv.
MELTZER, S. J. See AUER and MELTZER, xx.
MELTZER, S. J., and J. AUER. Is the anesthesia and motor paralysis caused by magnesium salts due to asphyxia? 141.
MELTZER, S. J. See JOSEPH and MELTZER, xxviii.
MELTZER, S. J. See SHAKLEE and MELTZER, xxix.
MENDEL, L. B., and S. R. BENEDICT. The excretion of magnesium and calcium, xviii.
Metabolism, affected by phosphorus, 246.
——, in development, xxxii.
——, in man with greatly diminished lung area, 412.
——, of heart, on stimulation of the accelerator nerve, 174.
——, proteid, during gestation, xxxi.
MILLER, F. R. On the rhythmical contractility of the anal musculature of the crayfish, xviii.
MURLIN, J. R. Protein metabolism in development, xxxi.
MURLIN, J. R. Total (or energy) metabolism in development, xxxii.

Muscle, acted upon by curare and physostigmine, 28.
——, of fowl, action of barium chloride upon, 46.
——, fatigue, xxxvii.
——, heat coagulation in, xv.
——, hydrolysis of, in fish, 81.
——, potassium contraction influenced by sodium chloride and calcium chloride, 374.
——, rhythmical contractility in crayfish, xviii.
——, rhythmical contraction in Gonionemus, xxxvii.
Myenteric reflex, xxvi.

NERVE, action of alkaloids of Papaveraceæ upon, 408.
——, action of curare and physostigmine on endings of, 28.
——, seventh cranial, course of, xxxvii.
Nerve impulse, nature of its conduction, 115.
Nutrition, the rôle of phosphorus in, 246.

OSBORNE, T. B., and F. W. HEYL. Hydrolysis of fish muscle, 81.
OSBORNE, T. B., C. S. LEAVENWORTH, and C. A. BRAUTLECHT. The different forms of nitrogen in proteins, 180.
Outflow recording apparatus, 23.

PAPAVERACEÆ, action of their alkaloids on the frog's heart, 389.
——, action of their alkaloids upon the motor nerve endings, 408.
Paramecium, adjustment to salt content of water, 48.
Pepsin, its mechanical destruction, xxix.
Pituitary gland, essential to life, xxvii.
Plant, O. H. Experiments on the absorption of fat from an isolated loop of small intestine in healthy dogs, 65.
PORTER, W. T., and R. RICHARDSON. A comparative study of the vasomotor reflexes, 131.
PORTER, W. T., and R. RICHARDSON. Maximum vasomotor reflexes obtained by stimulating portions of the sciatic nerve, xxxv.
PORTER, W. T., and R. RICHARDSON. On the interval between the minimal and maximal rise in blood pressure following stimulation of the sciatic nerve, xxxiv.
PORTER, W. T., and F. H. PRATT. On the interval between the minimal and maximal fall in blood pressure following stimulation of the depressor nerve, xxxv.
POWELL, W. H. See CARLSON, WOELFEL, and POWELL, xxiii.
PRATT, F. H. See PORTER and PRATT, xxxv.
Proteins, comparative digestibility in pepsin-acid solutions, 420.
——, their different forms of nitrogen, 180.
Pulse pressure, relation to albuminuria, xi.

REFORD, L. S., and H. CUSHING. Is the pituitary gland essential to the maintenance of life? xxvii.
Rheotropism in fishes, xxvii.
RICHARDSON, R. See PORTER and RICHARDSON, 131, xxxiv, xxxv.
ROTH, G. B. See EDMUNDS and ROTH, 28, 46.

SALT solutions, their effect upon the respiration, heart-beat, and blood pressure in the skate, 201.
SCHNEIDER, E. C., and C. A. HEDBLOM. Blood pressure with special reference to high altitudes, 90.
SHAFFER, P. A. The destruction of body protein in fever, xxxvii.
SHAFFER, PHILIP. The excretion of kreatinin and kreatin in health and disease, 1.
SHAKLEE, A. O., and S. J. MELTZER. The mechanical destruction of pepsin, xxix.
SHEPARD, J. F. I. — Cerebral circulation in sleep; II. Methods and results of blood-pressure measurements, xii.
Shock, 345, xxxvii.
——, relation to venous pressure, xxx.
SIMPSON, S. The intracentral portion of the seventh nerve root demonstrated by indirect Wallerian degeneration, xxxvii.
SIMPSON, S. See KING and SIMPSON. xiv.
Sleep, cerebral circulation in, xii.
SNYDER, C. D. Demonstration of the thread galvanometer and some of its applications in physiology, xxxvii.
Stomach, acid closure of cardia, 105.
——, course of contraction wave in, 165.
——, movements inhibited by opening the abdomen, xvii.
Stomach and intestine, peristalsis, xxvii.
Strophanthin, its absorption, excretion, and destruction, 303.

Strophanthin, its fate in the animal organism, xxxvii.
SUTHERLAND, W. The nature of the conduction of nerve impulse, 115.

TEMPERATURE sensations, following nerve division, xxii.
TERRY, O. P. The production, by hydrogen peroxide, of rhythmical contractions in the marginless bell of Gonionemus, xxxvii.
Thyroid, internal secretion of, xix.

VAGUS irritability of cardiac branches affected by calcium, xx.
Vasomotor mechanism possibly affected by hormones, xxiii.
Vasomotor nerves of spleen, xxxvii.
Vasomotor reflex, relation to portions of the sciatic nerve, xxxv.
——, interval between minimal and maximal rise in blood pressure on stimulating the sciatic nerve, xxxiv.
——, interval between minimal and maximal fall in blood pressure on stimulating the depressor nerve, xxxv.
Vasomotor reflexes, a comparative study, 131.
Venous pressure in man, xxxvii.
VOEGTLIN, C., and J. KING. On the antagonistic action of ammonium and calcium salts — a contribution to the knowledge of acidosis, xxxvii.

WIGGERS, C. J. An improved outflow-recording apparatus, 23.
WIGGERS, C. J. The influence of adrenalin over internal hemorrhages, xxv.
WIGGERS, C. J. The innervation of the coronary vessels, xxiv.
WILLIAMS, E. M. See LYON and WILLIAMS, xxxv.
WOELFEL, A. See CARLSON and WOELFEL, xix.
WOELFEL, A. See CARLSON, WOELFEL, and POWELL, xxiii.

YERKES, R. M. The relation of intensity of stimulus to rapidity of habit formation, xiii.

ZARTMAN, L. V. See HOOKER, HEGEMAN, and ZARTMAN, xi.
ZOETHOUT, W. D. On the influence of sodium chloride and calcium chloride in the potassium contraction, 374.

GENERAL LIBRARY,
UNIV. OF MICH.
MAR 4 1909

THE AMERICAN JOURNAL OF PHYSIOLOGY

EDITED FOR

The American Physiological Society

BY

H. P. BOWDITCH, M.D., Boston
R. H. CHITTENDEN, Ph.D., New Haven
W. H. HOWELL, M.D., Baltimore
FREDERIC S. LEE, Ph.D., New York
W. P. LOMBARD, M.D., Ann Arbor
G. N. STEWART, M.D., Chicago
W. T. PORTER, M.D., Boston

VOL. XXIII.—No. VI.

Issued March 1, 1909

BOSTON, U.S.A.

1909

CONTENTS

THE ACTION OF THE ALKALOIDS OF THE PAPAVERACEÆ UPON THE ISOLATED FROG'S HEART. *By Worth Hale* 389

THE ACTION OF THE ALKALOIDS OF THE PAPAVERACEÆ UPON THE MOTOR NERVE ENDINGS. *By Worth Hale* 408

METABOLISM IN MAN WITH GREATLY DIMINISHED LUNG AREA. *By Thorne M. Carpenter and Francis G. Benedict* 412

A COMPARATIVE STUDY OF THE DIGESTIBILITY OF DIFFERENT PROTEINS IN PEPSIN-ACID SOLUTIONS. *By William N. Berg* 420

CHEMICAL STUDIES ON THE EFFECTS OF CENTRIFUGAL FORCE ON THE EGGS OF THE SEA URCHIN (ARBACIA PUNCTULATA). *By J. F. McClendon* 460

THE AMERICAN JOURNAL OF PHYSIOLOGY is issued monthly. Each volume will contain about five hundred pages. The price of one volume sent postage free to subscribers in the United States and Canada is five dollars; to subscribers in other countries, five dollars and twenty-five cents. The price of Volumes One, Two, and Three will be six dollars to domestic subscribers, and six dollars and twenty-five cents to foreign subscribers. All subscriptions are payable in advance.

Subscriptions, manuscript, and all other communications should be sent to THE AMERICAN JOURNAL OF PHYSIOLOGY, Box 127, Back Bay Post Office, Boston, Mass., U.S.A.

Contributors will receive fifty copies of their papers free; additional copies may be obtained at cost.

Copyright, 1909, by W. T. PORTER.

Printed by John Wilson and Son, at The University Press, Cambridge, Mass.

Entered at the Boston, Mass., Post Office as second-class mail matter, Feb. 11, 1903.